

Microchip**Filter specification****TFS 190R****1/5****Measurement condition**

Ambient temperature:	25	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	590 Ω 11,0 pF	
Output:	680 Ω 11,2 pF	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 190R is the minimum of the pass band attenuation a_{min} . The minimum of the pass band attenuation a_{min} is defined as the insertion loss a_e . The centre frequency f_c is the arithmetic mean value of the upper and lower frequencies at the 1 dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 190.0 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the group delay ripple have to be achieved at the frequencies given below even if the centre frequency f_c is shifted due to the temperature coefficient of frequency TC_f in the operating temperature range and due to a production tolerance for the centre frequency f_c .

D a t a		typ. value		tolerance / limit			
Insertion loss (reference level)		a _e	7,1	dB	max.	11,0	dB
Nominal frequency		f _N				190,0	MHz
Centre frequency		f _C	190,012	MHz		-	
Passband		PB	-		f _N	± 640	kHz
Pass band ripple		p-p	0,5	dB	max.	1	dB
Relative attenuation		a _{rel}					
f _N	... f _N ± 640	kHz	0,5	dB	max.	1	dB
f _N ± 20,000	MHz ... f _N ± 4,000	MHz	52	dB	min.	45	dB
f _N ± 4,000	MHz ... f _N ± 1,980	MHz	39	dB	min.	35	dB
f _N ± 1,980	MHz ... f _N ± 1,250	MHz	27	dB	min.	25	dB
f _N ± 1,250	MHz ... f _N ± 885	kHz	22	dB	min.	20	dB
f _N ± 885	kHz ... f _N ± 750	kHz	3	dB	min.	1	dB
Average group delay f _N ± 480 kHz			1,3	µs	max.	2	µs
Group delay ripple f _N ± 480 kHz		p-p	160	ns	max.	200	ns
Phase linearity f _N ± 480 kHz		p-p	5,5	deg	max.	7,5	deg
Return loss f _N ± 480 kHz			13	dB	min.	10	dB
Input power level					max.	10	dBm
Operating temperature range		OTR	-			0 °C ... + 80 °C	
Storage temperature range			-			-35 °C ... + 85 °C	
Turn over temperature			38	°C		-	
Temperature coefficient of frequency		TC _f **	0,04	ppm/K ²		-	

*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

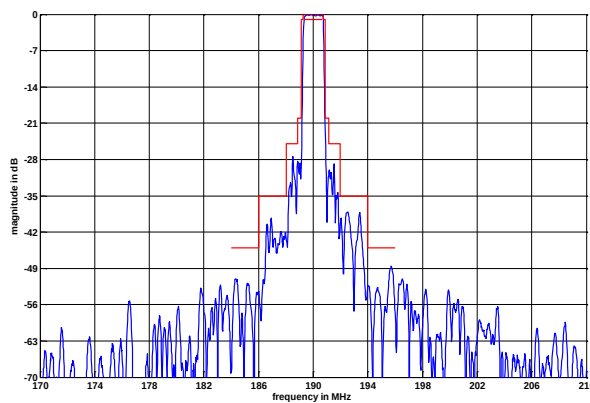
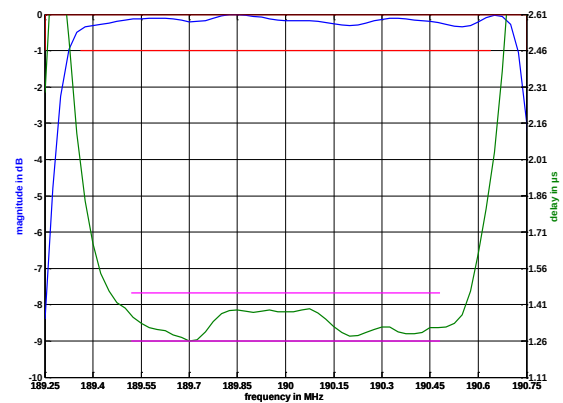
**) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$

Generated:

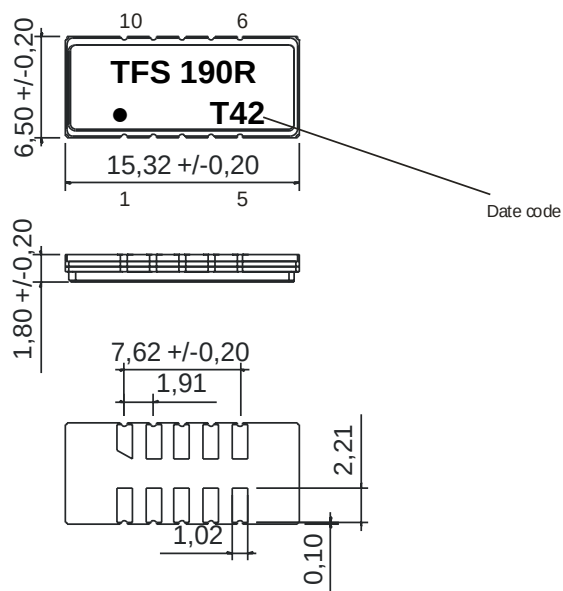
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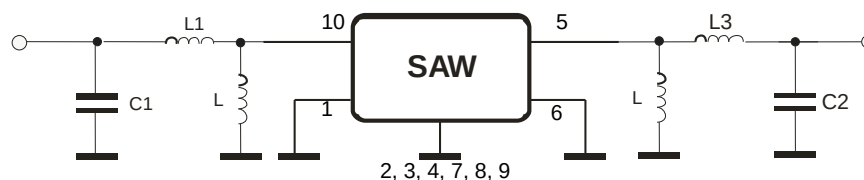
Filter characteristic**Construction and pin connection**

(All dimensions in mm)



1	Input RF Return
2	Ground
3	Ground
4	Ground
5	Output
6	Output RF Return
7	Ground
8	Ground
9	Ground
10	Input

Date code: Year + week
 T 2005
 U 2006
 V 2007
 ...

50 Ohm Test circuit**Microchip Frequency Technology GmbH****Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

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Microchip**Filter specification****TFS 190R****3/5****Stability characteristics**

After the following tests the filter shall meet the whole specification:

1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans;
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: twice max.;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

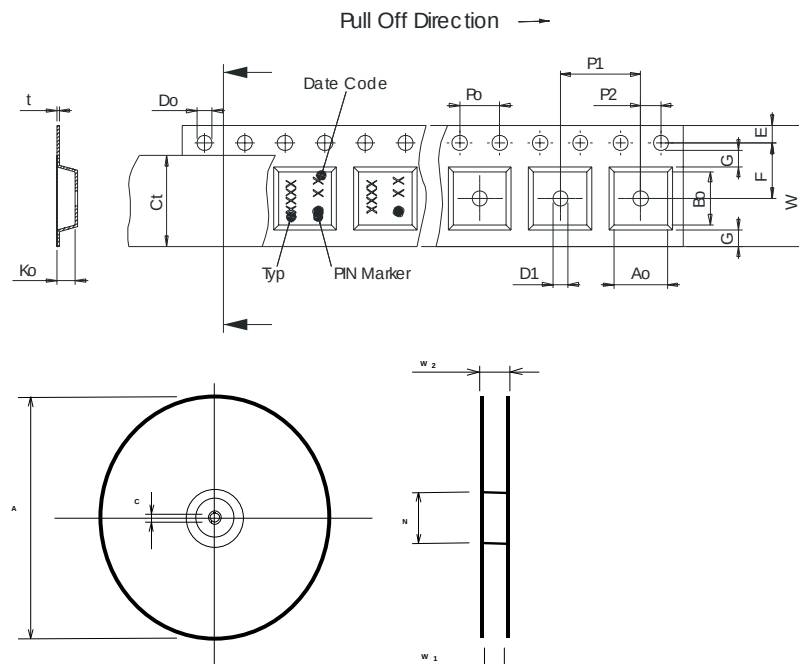
Packing

Tape & Reel: IEC 286 – 3, with exeption of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters peer reel: 1700
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

Tape (all dimensions in mm)

W	: 24,00 +0,30/-0,10
Po	: 4,00 ± 0,1
Do	: 1,50 +0,1/-0
E	: 1,75 ± 0,10
F	: 11,50 ± 0,10
G(min)	: 0,60
P2	: 2,00 ± 0,1
P1	: 12,00 ± 0,1
D1(min)	: 1,50
Ao	: 7,10 ± 0,10
Bo	: 13,90 ± 0,10
Ct	: 21,5 ± 0,1

**Reel (all dimensions in mm)**

A	: 330
W1	: 24,4 +2/-0
W2(max)	: 30,4
N(min)	: 60
C	: 13,0 +0,5/-0,2

The minimum bending radius is 45 mm.

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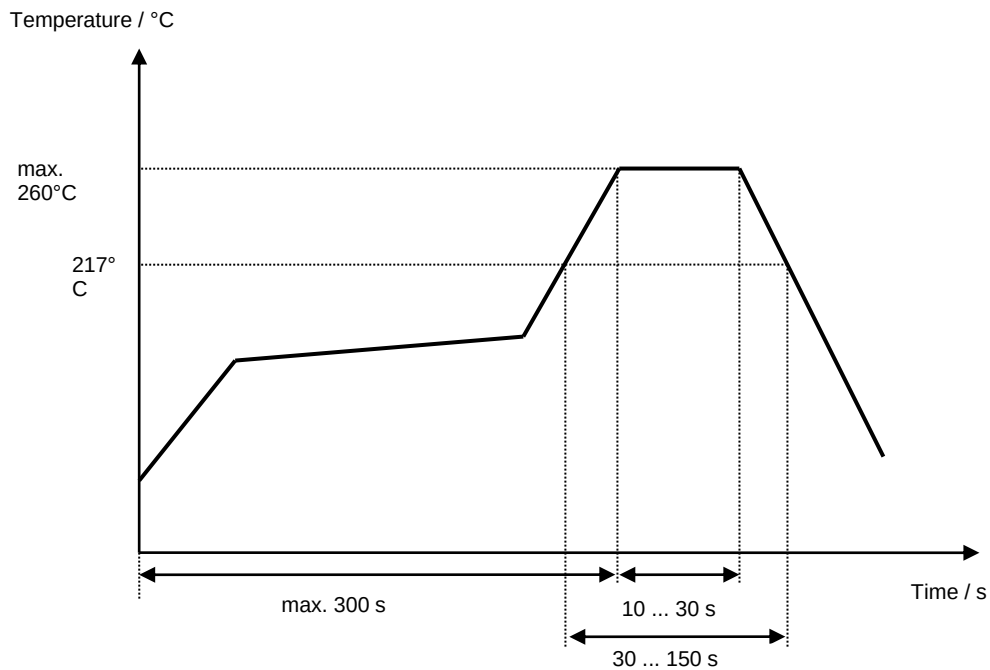
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Air reflow temperature conditions

Conditions	Exposure
Average ramp-up rate (30°C to 217°C)	less than 3°C/second
> 100°C	between 300 and 600 seconds
> 150°C	between 240 and 500 seconds
> 217°C	between 30 and 150 seconds
Peak temperature	max. 260°C
Time within 5°C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50°C)	less than 6°C/second
Time from 30°C to Peak temperature	no greater than 300 seconds

Chip-mount air reflow profile**Microchip Frequency Technology GmbH****Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

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Microchip**Filter specification****TFS 190R****5/5****History**

Version	Reason of Changes	Name	Date
1.0	generated development specification	Strehl	06.06.2005
1.1	- 'return loss' and 'average group delay' : frequency range defined - matching configuration added	Pfeiffer	05.07.2005
1.2	- terminating impedance, typical values and filter characteristic added - matching configuration changed - group delay limit changed to max. 200 ns - phase ripple limit set to max. 7,5° p-p	Pfeiffer	14.10.2005

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